To: W. C. McFadden Date: 4 November 1957

From [redacted]

Subject: Report of Current Activities

1. Equipment

1.1 B. Configuration Rework (See Encl. (1))

A detailed program has been established for the rework of the B Configuration to:

Maximize Reliability

Maximize Quality

Incorporate additional necessary features

The program is aimed toward shipping proved B Cameras overseas by 15 March 1958.

1.2 Shutter HS-732 (See Encl. (2))

In a life test run, shutter s/n 62 was operated for 157,000 cycles without malfunction. Normal field type inspections and adjustments were made every 5,000 cycles. At 25,000 cycles a relay was replaced. At 157,000 cycles the idler gear shaft broke and all positions of the worm gear had been used. No other breakage or excessive wear occurred. Engineering will make a detailed wear analysis. The shutter will be overhauled and returned to service. Some additional shutters will be similarly life tested. In connection with other camera tests, several other shutters have run over 50,000 cycles without malfunction.

1.3 Vibration Studies of B Configuration (See Encl. (3))

Accelerometer tests in the lab indicated the vibration introduced by the shutter trip and drive action during shutter open time could be fully attenuated by mounting the shutter on rubber buttons. Flight tests with rubber mounted shutters indicated an improvement in photo results. There was still OCCASIONAL vibration detectable in the negatives and further studies will be made to isolate other variables. Accelerometer recordings will be made with the configuration mounted in the article and also during flight test.

1.4 Flight Tests of B #13 (See Encl. (4))

Nine flight tests have been made with B #13. In the first four, which were run in September, shutter failures occurred. Other components operated satisfactorily. In the last five, which were run in October by [redacted] STAT Field Engineers, all components, including the shutter, operated satisfactorily. Further flight tests will be made with B #13 in connection with the vibration studies.

1.5 Radio Noise (See Encl. (5))

Radio noise tests have been conducted on C Configuration and filters installed on C #2 which reduce the radio noise adequately. Next flight test, scheduled for 1 November, will include the radio noise filters and if satisfactory, the filters will be installed on the other C Configurations.

2. Flight Tests

2.1 Red Dot Tests

The red dot tests with A-2 Configurations have been completed except for Test #19 which will be rerun in the first week of November. On completion of Test #19, and on receipt of notice from Ed Green that the take is satisfactory, the equipment, which is on loan from FOG, will be returned.

The rerun of last years red dot tests #1 thru #13 will be accomplished with the A-2 equipment from Detachment A.

The red dot tests with B Configuration will be run after completion of the vibration studies.

2.2 Tracker Film for Processing Studies

The tracker camera at EAFB is not operable at the moment. As soon as it can be put in operating condition, we will run trackers with all test flights to obtain a quantity of film for processing studies. The exposed unprocessed film will be forwarded to Ed. Green.

2.3 Scheduled Flights

In September the Test Site ran:

4 A-2 Red Dot flights

4 B Configuration flights

0 C Configuration flights

In October the Test Site ran:

4 A-2 Red Dot flights

5 B Configuration flights

2 C Configuration flights.

3. Facilities

The Maintenance and Overhaul activity has been consolidated into the Plant #9 location. Completion of the piece part spares manufacture will be accomplished by the Plant #10 shop.

4. Contracts

The contract amendment of BC-200 for Configuration C Spares was received and acknowledged. Contract proposals have been submitted by Hycon for OS-100, FS-99 and BC-450.

5. Other Comments

Hycon actions agreed upon in the 9 October 1957 meeting have been initiated.

The equipment required for staging is being reviewed. We have a report on Detachment C staging equipment as used in their staging operation. A report on Detachment B staging equipment is being prepared. We have a report on Detachment A planned staging equipment. The information will be consolidated and reviewed and a final recommendation prepared.

Rolit mirrors have been resurfaced and returned to EAFB. The installation is ready to proceed pending approval by Hqs.

Film inventory and test requirements were forwarded to Hqs. by TWX.

STAT

Maximize Reliability

In camera body add stiffness to structure side wall and cross panel. Improve cassette light seal.

In film transport study and adopt if feasible to eliminate tension sensor. Increase film spool core from 4" to 6" diameter on take up. Increase stiffness of spool support shaft. Use only Western Gear Motors in take-ups. Minimize backlash in IMC Drive. Strengthen some film drive components. Make analytical studies:

Environment

Take-up motor demand curve

Electrical Load diagram

Endurance Tests

Maximize Photo Quality

In shutter add rubber button mounting. Reduce internal shocks by spring loading worm shaft. In camera body improve image of data unit. In film transport reduce take-up motor gear noise and isolate vibration. Oblique Drive - Investigate cyclic gear train to minimize shock. Analytical Studies - Make accelerometer tests of lens, mirror, platen. Study vacuum consistency. Recoat mirrors as required.

Additional Features

Incorporate remote control of mode selection. Install position indicators already manufactured. Ruggedize B Spool shipping package. Continued support of test site activities. Improve radio noise suppression for ADE

PREPARED BY: Elfuso	HYCON MFG. COMPANY	PAGE 1 of 4
CHECKED BY: [illegible]	PASADENA CALIFORNIA	FOR HS-732
DATE: 29 Oct 57	DURABILITY TEST HS-732 Serial #62	REPORT

TEST CONDITIONS:

Test at runaway - 47 cycles per minute.
Shutter tested in camera at right oblique, left oblique, and vertical positions, allowing shutter to stay 15 minutes in each position.
Shutter started operation with worm gear in #2 position. #1 position was worn during previous operations before modification.

Oct. 1, 1957
Shutter operated 10,000 cycles. Factory run-in check. Shutter inspected to check list 738000. No malfunctions. After 10,000 cycles readjusted ring gear; relubed idler gear bearings, motor drive and changed worm gear to #3 position. Total Cycles: 10,000

Oct. 7, 1957
Running time -- 12:55 pm to 2:29 pm
5,000 cycles - No malfunctions
Limit switches increased 1/2 turn. Reset switches, cleaned and lubed worm gear. Total Cycles: 15,000

Oct. 7, 1957
Running time -- 2:55 pm to 4:29 pm
5,000 cycles - No malfunctions, no change.
Cleaned and relubed worm gear. Total Cycles: 20,000

Oct. 7, 1957
Start 4:55 pm. Stopped shutter at 6:00 pm -- 23,750 cycles.
K-2 relay showed signs of sticking points due to runaway operation. Double pulsed on runaway but operated properly when switched to intervalometer. Continued run on intervalometer to complete 5,000 cycles. Changed relay, reset latches and limit switches. Relay defect showed up only at runaway, would not have any affect on normal operation. Disassembly of relay showed burned points. Started study of arc suppression requirements. Cleaned and lubed worm gear. Total Cycles: 25,000

Oct. 7, 1957
Running time 7:55 pm to 9:29 pm; 5,000 cycles.
No malfunctions. 8:55 pm motor started to sound loggy; checked speed at 9:10 pm, 43 cycles per minute. This was found due to worn worm gear. Gear was changed to position #4. .003 shim added to trip latch; reset latches; cleaned and relubed worm gear.
Total Cycles: 30,000

HYCON MFG. COMPANY
PASADENA CALIFORNIA

DURABILITY TEST HS-732
Serial #62

Oct. 8, 1957
Running time 7:55 pm - 5,000 cycles; no malfunctions; 47 cycles per minute. Cleaned and relubed worm gear. Total Cycles: 35,000

Oct. 8, 1957
Running time 9:55 am to 11:29 am - 5,000 cycles; no malfunctions. 11:00 am checked cycles, 45 per minute. Total Cycles: 40,000

Oct. 8, 1957
11:55 am, started 47 cycles per minute.
1:10 pm, relay began double pulse due to runaway; switched to intervalometer from runaway. Relay completed 5,000 cycles at 1:40 pm. No malfunctions. Added .1 condenser across same relay points to suppress arcing; cleaned and lubed worm gear.
Total Cycles: 45,000

Oct. 8, 1957
Started 2:10 pm same relay at runaway with condenser across contacts. 2:55 pm 46 cycles per minute. End 3:44 - 5,000 cycles. No malfunctions. Total Cycles: 50,000

Oct. 9, 1957
Ran shutter 10,000 cycles. Adjusted limit switches, arresting latches and pivot posts. At 60,000 cycles changed worm gear to #3-1/2 position. Cleaned and re-lubed worm gear and latch pin. Cleaned motor and gear box. Increased brush spring tension 1/2 turn. Total Cycles: 60,000

Oct. 9, 1957
Ran shutter 2,300 cycles. Shut off at end of work day. Shutter checked out OK. Total Cycles: 62,300

Oct. 10, 1957
Ran shutter 2,700 cycles. Adjusted arresting latches. Cleaned and relubed worm gear and latch pin. Otherwise shutter checked out OK. Total Cycles: 65,000

Oct. 10, 1957
Ran shutter 5,000 cycles. Cleaned and relubed worm gear and latch pin. Oiled blade bearings and remolyed gears and ring gear.
Total Cycles: 70,000

Oct. 10, 1957
Ran shutter 5,000 cycles. Worm gear and latch pin cleaned and relubed. Carriage cam adjusted all the way. Checked shutter speed. No bounce. Total Cycles: 75,000

PREPARED BY	HYCON MFG. COMPANY	PAGE 3 of 4
	PASADENA CALIFORNIA	
CHECKED BY	DURABILITY TEST HS-732	JOB
DATE 29 Oct 57	Serial #62	REPORT

Oct. 10, 1957
Ran shutter 5,000 cycles. Adjusted limit switches. Relubed motor gear box. Changed worm gear to second run on position #1.
Total Cycles: 80,000

Oct. 11, 1957
Ran shutter 5,000 cycles. Shutter checked out OK. Total Cycles: 85,000

Oct. 11, 1957
Ran shutter 5,000 cycles. Worm gear and latch pin cleaned and relubed.
Total Cycles: 90,000

Oct. 11, 1957
Ran shutter 7,500 cycles. Shutter checked out OK. Total Cycles: 97,500

Oct. 14, 1957
Ran shutter 2,500 cycles. Cleaned and relubed worm gear and latch pin. Checked and cleaned motor and motor gear box. Blades rubbed with silicone grease. Total Cycles: 100,000

Oct. 14, 1957
Ran shutter 5,000 cycles. Cleaned and relubed worm gear and latch pin. Total Cycles: 105,000

Oct. 15, 1957
Ran shutter 5,000 cycles. Shutter checked out OK. Total Cycles: 110,000

Oct. 15, 1957
Ran shutter 5,000 cycles. Shutter checked out OK. Total Cycles: 115,000

Oct. 16, 1957
Ran shutter 10,000 cycles. Cleaned and relubed worm gear and latch pin. Extended inspection and relube period to 10,000 cycles.
Total Cycles: 125,000

Oct. 16, 1957
Ran shutter 10,000 cycles. Cleaned and relubed worm gear and latch pin. Total Cycles: 135,000

Oct. 17, 1957
Ran shutter 10,000 cycles. Cleaned and relubed worm gear and latch pin. Total Cycles: 145,000

Oct. 18, 1957
Ran shutter 10,000 cycles. Cleaned and relubed worm gear and latch pin. Total Cycles: 155,000

PREPARED BY	HYCON MFG. COMPANY	PAGE 4 of 4
	PASADENA CALIFORNIA	
CHECKED BY	DURABILITY TEST HS-732	JOB
DATE 29 Oct 57	Serial #62	REPORT

Oct. 18, 1957

Ran shutter 2,120 cycles. Idler gear shaft broke at ball bearing seat. Inspection showed that fatigue fracture had developed at sharp shoulder at bearing seat and had been in existence for some time since fractured surfaces were worn almost smooth. Less than 1/16 of metal remained intact across center of diameter, at right angles to shock loads, at time of failure. Sharp corner was previously corrected on drawing and preheat-treat has been specified to avoid post production heat stresses. The several parts made similar to this piece are being scrapped and will be inspected for fatigue cracks at 100,000 cycle factory overhaul. Shutter turned over to Engineering for wear analysis. Shutter to be overhauled completely and returned to service. Total Cycles: 157,130

STAT

Appr

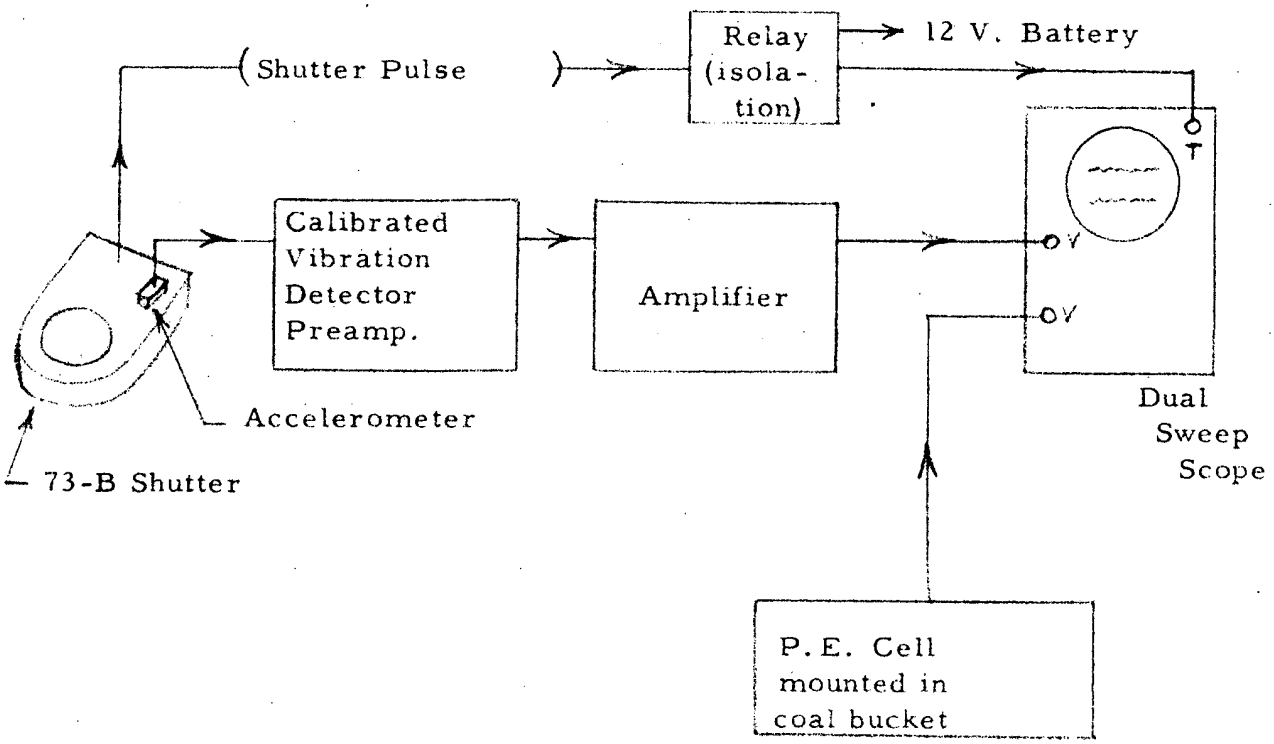
PREPARED BY DMT	**HYCON MFG. COMPANY** PASADENA CALIFORNIA	PAGE
CHECKED BY	PRELIMINARY ENGINEERING REPORT, VIBRATION STUDY 73-B SHUTTER	JOB
DATE 11-12-57		REPORT

1. Tests were conducted on 10-21-57 by Moors and Cadman.

2. Test Conditions: 73-B Shutter Serial #37 was mounted in B Configuration, Serial #2. The configuration was secured to the ridged steel mount on a concret floor. Ambient noise levels were low enough to be acceptable during the test period.

3. The output from the accelerometer was fed into the calibrated vibration detector where it was preamplified, then to the amplifier. This output was connected to the vertical input on one channel of a double sweep scope. The photo electric cell was placed in the "coal bucket" inside the configuration, the output being connected to the second channel vertical input on the scope. The scope was triggered by a 12 volt battery source actuated thru a relay controlled by the shutter trip pulse.

4. Actual recordings were made with a Polaroid Recording Camera attached to the scope.

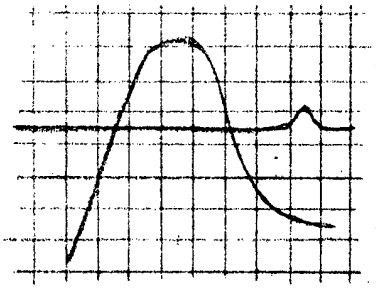


PREPARED BY DMT | **HYCON MFG. COMPANY** PASADENA CALIFORNIA | PAGE

CHECKED BY | JOB

DATE 11-12-57 | VIBRATION DATA CONFIG. 73-B | REPORT

A.



Shutter Transient on Lens Housing, Side to Side.

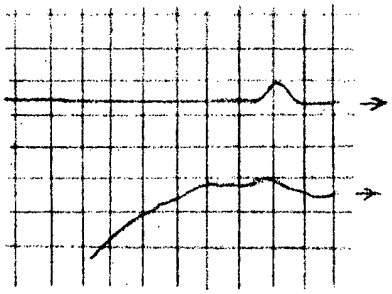
Preampl: Attn. 1 X
Displ. 10-1 CM

D.C. Ampl: Gain 0 DB

Scope: Vert. 1 V/CM
Horz. 5 MS/CM

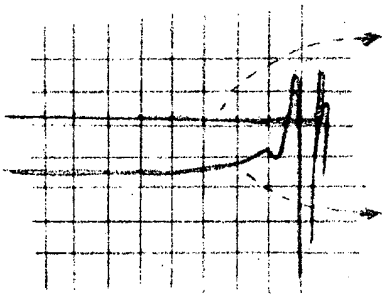
Scale Factor .0027 IN./DIV

B.



Remarks: No shock mount.

A.



Shutter Transient on Lens Housing, Side to Side.

Preampl: Attn. 1 X
Displ. 10-1 CM

D.C. Ampl: Gain 0 DB

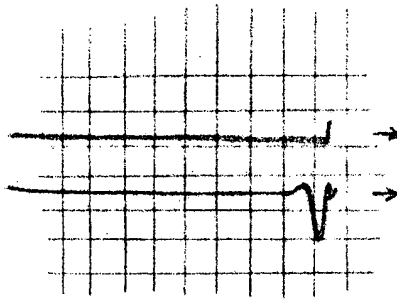
Scope: Vert. 1.0 V/CM
Horz. 200/200 MS/CM

Scale Factor .003 IN/DIV

Remarks: No Shock Mount

(Indicator reads approx. .005)

B.



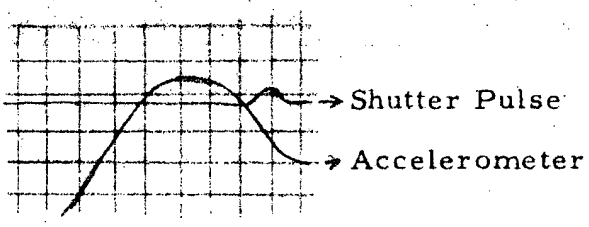
PREPARED BY DMT
CHECKED BY D.T.
DATE 11-12-57

HYCON MFG. COMPANY
PASADENA CALIFORNIA

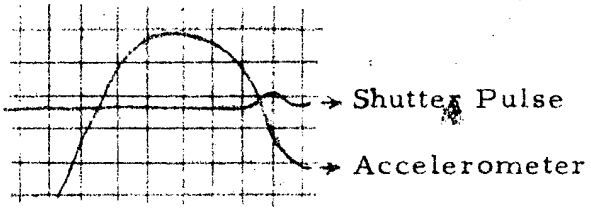
PAGE
JOB
REPORT

VIBRATION DATA CONFIG. 73-B

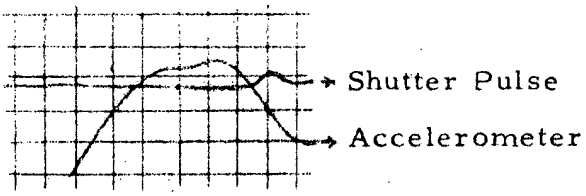
A.



B.



C.



Pick-Up Location: Shutter

Preampl: Attn. 1 X
Displ. 10-1 CM

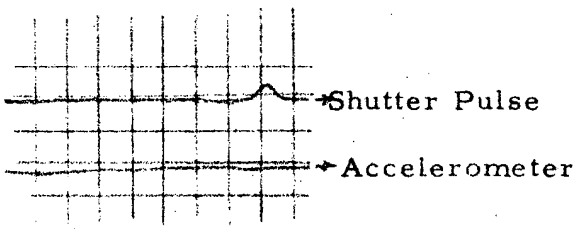
D.C. Ampl: Gain 0 DB

Scope: Vert. 1. 1. 1. V/CM
Horz. 5 5 5 MS/CM
A B C

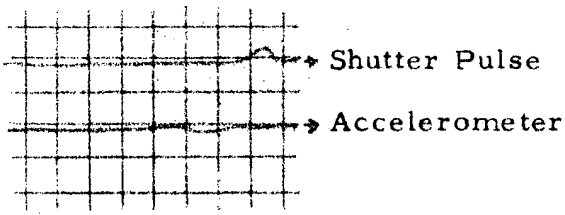
Scale Factor .003 IN/DIV

Remarks: Shock mounted on soft rubber buttons.

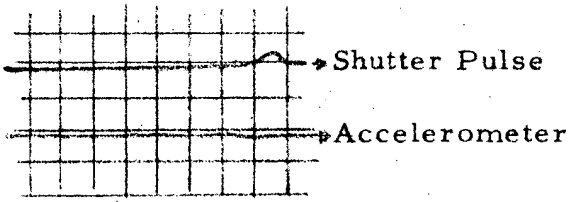
A.



B.



C.



Pick-Up Location: Lens Housing

Preampl: Attn. 1 X
Displ. 10-1 CM

D.C. Ampl: Gain 0 DB

Scope: Vert. 1 1 1 V/CM
Horz. 5 5 5 MS/CM
A B C

Scale Factor: .003 IN/DIV

Remarks: Shutter mounted on rubber buttons.

MECHANICAL AND ELECTRICAL OPERATION

Date	Mission	Config.	Location	Conditions: S-Shutter Speed, f-stop, Filter, Article, Purpose	Film Transport	Oblique Drive	Pro-grammer	Shutter	Other	Photo Quality: Max. Average, Excellent, Very Good, Fair, Poor	Degradation Due To: C-Camera, M-A/C motion, I-Image motion, P-Process, W-Weather	Comments: F - TWX Report, M - Mission Report, A - Take Analysis
									% Take			
9-19-57	PTF-202	#13	Test Site	1/200 sec. f/10 yellow a/c 351	100%	100%	100%	74%		very good	VIB	HS-732 SN 41 failure after 1800 cycles due to defective start switch. Foreign matter between contacts due to loosening of cracked switch. Vibr. & move. on 40% of fram 10% clouds 50% has a resolution of 20-30 lines.
9-20-57	PTF-203	#13	Test Site	1/200 sec. f/10 yellow a/c 351	100%	100%	100%	0%		no clips		HS-732 SN 41 failure at start of flight. Pre flight check was O.K. Disintigration of idler gear roller bearing. Substitute bearing ball diameter .040" instead of .093".
9-25-57	PTF-204	#13	Test Site	1/200 sec. f/10 yellow a/c 710	100%	100%	100%	19%	19%	good	VIB	Failure HS-732 SN 41. Believed to be mal-adjusted. Trip latch would snap out of its holding position.
9-26-57	PTF-205	#13	Test Site	1/200 sec. f/10 yellow a/c 710	100%	100%	100%	16%	16%	good	VIB	HS-732 SN 41 failure. Foreign matter between contacts due to loosening of crack switch. Not visually detected outside.
				(IMPROVED SHUTTERS USED HEREAFTER.)								
10-9-57	PTF-207	#13	Test Site	1/200 Sec. f/10 yellow a/c 360	100%	100%	100%	100%	100%	good	VIB	Mode 1 Pattern 1. Eval. from test clips 65% clouds. Vibr. app. 20% of frames. Reso 15% 10 to 25 lines per mm.
10-16-57	PTF-208	#13	Test Site	1/200 sec. f/16 yellow a/c 360	100%	100%	100%	100%	100%	good	VIB	Mode 1 Pattern 1 Heaters turned on bef operation & left on during operation Eval from clips. 10% clouds. Vibr. on approx. of all frames. Resolution on 50% 15 to 2 lines per mm.
10-22-57	PTF-210	#13	Test Site	1/200 sec. f/16 yellow a/c 360	100%	100%	100%	100%	100%	good	VIB	Mode 1 Pattern 2 Vertical indicator light showed light leaks & data lights show light bleeding off on film. Vibr. on app. 60% of all frames. Resol. on 40% of frames 20 to 30 lines per mm.
				(SHOCK MOUNTED SHUTTERS)								
10-24-57	PTF-211	#13	Test Site	1/200 sec. f/16 yellow a/c 343	100%	100%	100%	100%	100%	good	Primarily Image Motion Occasional Vibration	Shock mounted HS-732. VIBr & Image mo Approx 75% of fram Mode 1, 2, 3 Pattern 2 Resol. on 25% of frames 20 to 30 Lines.
10-28-57	PTF-212	#13	Test Site	1/200 sec. f/16 yellow a/c 343	100%	Disconnected	100%	100%	100%	good	A/C Motion	Oblique Drive disconnected for VIB test. Photo Eval. 95% clouds. Resolution on 5% of frames 15 to 20 lines per mm. Excessive aircraft motion obscured Vibration Analysis.

MECHANICAL AND ELECTRICAL OPERATION

Date	Mission	Config.	Location	Conditions	Film Transport	Oblique Drive	Pro-grammer	Shutter	Other	Photo Quality	Degradation Due To	Comments
				S-Shutter Speed f-stop Filter Article Purpose					% Take	Max. Average Excellent Very Good Fair Poor	V-Vacuum C-Condensation M-A/C motion VIB-Image motion P-Process W-Weather	T - TWX Report M - Mission Report A - Take Analysis
11-5-57	PTF 214	B #13	Test Site	1/200 sec. f/16 yellow A/C 343	100%	Disconnected for fixed vertical operation	100%	100% (Shock Mount)	100%	Poor to very good	Motion due A/C slight VIB	(M) Flight instrumented for recording YAW PITCH-ROLL-IMC MOTION-SHTR PULSE on Mode 2 operation. WX condit. poor after 2000! (Pattern 2) Fixed vertical. Duration 3 hr. 47 min. with & without auto pilot. (A) Portion without autopilot 28% 30-35 l/ With autopilot 15% 30-35 l/mm., Areas of l resolution correlate with recordings of excessive A/C motion.
				SHOCK MOUNTING IMPROVED HEREAFTER								
11-15-57	PTF 216	B #13	Test Site	1/200 sec f/16 yellow A/C 343	100%	Disconnected for fixed vertical operation	100%	100% Shock Mount (Improved)	100%	Good to excellent	Occasional Slight VIB	(M) Pattern 2 fixed vertical. Ind. light inoperative. Duration 2 Hrs. 10 Min. Sam. instrumentation as PTF 214. (A) 90% of frames good to excellent. Prior this flight new autopilot & Mach sensor installed. Apparent reduction A/C Motion over previous mission, Resolution varied 25-40 l/mm.
11-21-57	PTF 219	B #13	Test Site	1/200 sec. f/16 yellow plus yellow gelatin filter A/C 343	100%	100%	100%	100% Shock Mount (Improved)	100%			(M) Modes 1, 2 , 3 Pattern 2. Duration 4 Hr. 30 Min. Rough weather reported during last part of mission. Instrumented same as PTF 214 less IMC. (A) Evaluation analysis being conducted.

HYCON MODEL 73-C CAMERA SYSTEM

RADIO INTERFERENCE SUPPRESSION

WORK PLAN

25 October 1957

1.0 INTRODUCTION

1.1 Subject. The subject with which this work plan is concerned is the radio noise interference which is created by the 73-C Configuration.

1.2 Purpose. It is intended that this work plan be a systematic and logical approach to the problem of radio interference in the 73-C. It is not meant to be a rigid plan, but one which presents a framework for the systematic solution of each problem.

1.3 Scope. Basically, the intention is to detail a procedure of testing, correction, performance testing, and evaluation. An appendix is attached which outlines briefly the general problem of radio interference.

2.0 DESCRIPTION OF THE PROBLEM

2.1 Radio Interference. Specifically, the 73-C Configuration generates noise which interferes with the aircrafts radio and ADF equipment.

2.2 Mode of Propogation. Two modes exist: conduction and radiation. It is expected that both modes will be encountered.

2.3 Frequency Range. The frequency range of interference with which we are concerned extends from 150 KC to 400 MC.

2.4 Permissible Levels. The level to which the radio interference is to be reduced shall be defined as the level which permits the aircraft's radio equipment to perform satisfactorily. This shall be determined by Hycon engineers in cooperation with the aircraft personnel concerned.

3.0 PROCEDURES.

3.1 Testing.

3.1.1 All units of the 73-C Configuration which are suspected of being interference sources are to be tested by either the radio noise facilities of Cornel-Dubilier (or similar facilities) or by our own RF (G.F.E.) receiver.

3.1.2 It shall be the function of the above test to determine the sources of radio interference, the interference level associated with each source, and to find filter devices and/or develop techniques which will reduce the level of interference.

3.2 Correction.

3.2.1 The results of the testing described in 3.1 will indicate the correct means of reducing the interference.

3.2.2 Units which are prime offenders will be modified first and tested as outlined in 3.3.

3.2.3 It is anticipated that in the majority cases, the radio interference will be reduced adequately by the use of:

1) Filters.

2) Arc suppression devices.

3) Shielding.

4) Improved Bonding.

3.2.4 All corrective work shall be accomplished at Hycon Plant #9 under the supervision of the engineers responsible for the particular units.

3.3 Performance Testing

3.3.1 Each modified unit will be taken to the Test Site and installed in the 73-C Configuration.

3.3.2 The Configuration will be installed in the aircraft and operated in conjunction with the radio equipment.

3.3.3 A qualitative comparison of the interference levels and an evaluation of the improvement of the levels by the modification of each unit will be made at this time.

3.3.4 Further testing and improvement will depend upon the performance of the modified units as determined by a flight test.

Progress Report No. 1

RADIO INTERFERENCE SUPPRESSION

WORK PLAN

24 October 1957

1. TESTS PERFORMED.

1.1 Units Tested As of this date, the following units have been tested by the radio noise facilities at Cornel-Dubilier Electric Corp., Venice, California.

1.	Gyro Sensor Assembly	Part No. 733895
2.	Film Take-Up Motor	Part No. 734360
3.	Aperture Motor	Part No. 733273
4.	Tension Regulator Motor	Part No. 734181
5.	Film Drive Motor	Part No. 733646
6.	Oblique Drive Motor	Part No. 733676
7.	Main Junction Box	Part No. 734120
8.	Film Drive Servo	Part No. 733640
9.	Oblique Drive Servo	Part No. 733670
10.	Stabilizer Servo	Part No. 733870
11.	Programmer	Part No. 733600
12.	Stabilizer Power Supply	Part No. 733885

Items 7, 8, 9, and 10 above comprise the Electrical Rock.

1.2 Conditions of Testing The radio interference testing facilities at Cornell-Dubilier Electric Corp., are designed and equipped to conform with the environmental requirements of Mil-I-6181B. In brief, this means the tests were performed in a screened room with no detectable interference present; the equipment being tested was mounted on a ground plane of specified minimum dimensions and properly bonded to the screen room; the equipment was bonded properly to the ground plane; line stabilization networks were utilized on the power lines; and AN-type radio interference measuring sets were used for quanitative results.

2.0 TEST RESULTS.

2.1 The units which were determined to be prime sources of radio interference were:

1. Film Take-Up Motor
2. Aperture Motor

2.1 (cont'd)

3. Tension Regulator Motor
4. Film Drive Motor
5. Oblique Drive Motor
6. Programmer
7. Gyro Sensor Assembly

The order of the above list is not intended to indicate the magnitude of the radio interference emitted by each unit.

2.2 Recommendations. With the exception of the Gyro Sensor Assembly, which did not receive further testing, filter devices were tested and techniques recommended by Cornell-Dubilier for all other units listed above.

2.3 Levels After Filtering. Although Mil-I-6181B specifications are intended to be used only as a guide, tests performed by Cornell-Dubilier indicate that all the motors can easily be modified to be well below the specified maximun levels of Mil-I-6181B. Tests on the Programmer (after filtering) indicate a substantially reduced level which should be adequate.

3.0 MODIFICATIONS

3.1 Motors The motors tested (i.e., the Film Drive, Film Take-Up, Aperture, Tension regulator). Have been modified as follows:

a. A filter, of the type recommended by Cornell-Dubilier, has been installed.
b. The units have been reworked to obtain better shielding. This has mainly been accomplished by use of shielded wire.
c. Great care has been taken to insure good bonding between surfaces to improve the electrical ground. Insulating layers, such as anodize, have been removed at the points of contact and the surface cleaned.

The direct purpose of the above modifications is to contain the radio interference within each unit and thereby prevent conduction and /or radiation to occur.

3.2 Programmer. A shielded box has been constructed upon which has been mounted twenty five filters. This filter assembly has been taken to the Test Site, mounted adjacent to the Programmer, and the filters inserted into the appropriate leads. The filters used were recommended by Cornell-Dubilier.

3.3 Gyro Sensor Assembly. The prime sources of radio interference in unit are the heater circuits of the gyros. A double RC network of our own design has been installed across the relay contacts in each circuit of the unit in the 73-C Configuration at the Test Site.

4.0 PERFORMANCE TEST.

4.1 Testing. The above modified parts were removed to the Test Site and installed in the 73-C Configuration there. Test procedures were carried out as outlined in the Work Plan, Section 3.3.

4.2 Test Result. After the configuration was installed the article was towed to a remote section of the flight line. The unit was operated in different Modes for half an hour while Mr. Joe Falcon, aircraft radioman listened on various receiver channels for radio noise. His opinion was that the noise had been reduced to an amount that was barely noticiable and would present no receiving problem.

4.3 Flight Test The 31 October 1957, Test Flight, of the 73-C will be used for a pilot's evaluation.